

Supersedes:

Industrial automation systems and integration — Reference data library for the process industries — Part 4: Initial reference data

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ABSTRACT:

This document defines the initial set of reference data for use with the ISO 15926 and ISO 10303-221 industrial data standards

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industrial data, oil and gas, process industries, facility, life-cycle, integration, overview

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Foreword

ISO (the International Organization for Standardization) is a world wide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75% of the member bodies casting a vote.

International Standard ISO 15926-6 was prepared by Technical Committee ISO/TC184, *Industrial automation systems and integration*, Subcommittee SC4, *Industrial data*.

ISO 15926 consists of the following parts under the general title *Industrial automation systems and integration – Integration of life-cycle data for oil and gas production facilities*:

- Part 1, Overview and fundamental principles
- Part 2, Data model
- Part 4, Initial reference data;
- Part 5, Procedures for registration and maintenance of reference data;
- Part 6, Scope and methodology for developing additional reference data.

Annexes A, B and C form an integral part of this part of ISO 15926.

0 Introduction

ISO 15926 is organized as a number of parts, each published separately. This part of ISO 15926 defines the initial set of reference data.

0.1 Background

ISO 15926 is an International Standard for the representation of process industries facility life-cycle information. This representation is specified by a generic, conceptual data model that is suitable as the basis for implementation in a shared database or data warehouse. The data model is designed to be used in conjunction with reference data, i.e., standard instances that represent information common to a number of users, production facilities, or both. The support for a specific life-cycle activity depends on the use of appropriate reference data in conjunction with the data model.

0.2 Purpose of ISO 15926-4

The purpose of this International Standard is to define the initial content of standard reference data for the process industry.

0.3 Description of ISO 15926-4

ISO 15926-4 consists of:

- a) a statement of scope of the standard;
- b) a specification of the initial content of the reference data library

0.4 Typographical conventions

The following typographical conventions are used in this International Standard.

A numbered reference enclosed in brackets (for example, “[2]”) is a reference to a document that is listed in the Bibliography.

In this International Standard the same English language words may be used to refer to an object in the real world or to a concept, and as the name of an EXPRESS data type that represents this object or concept. The following typographical convention is used to distinguish between these. If a word or phrase occurs in the same typeface as narrative text, the referent is the object or concept. If the word or phrase occurs in a bold typeface, the referent is the EXPRESS data type. Names of EXPRESS schemas also occur in a bold typeface.

The name of an EXPRESS data type may be used to refer to the data type itself, or to an instance of the data type. The distinction between these uses is normally clear from the context. If there is a likelihood of ambiguity, the phrase “entity data type” or “instance(s) of” is included in the text.

Double quotation marks “ ” denote quoted text. Single quotation marks ‘ ’ denote particular text string values.

Some components of this International Standard are available in electronic form. This access is provided through the specification of Universal Resource Locators (URLs) that identify the location of these files on the Internet. If there is difficulty accessing these files contact the ISO Central Secretariat, or contact the ISO TC 184/SC4 Secretariat directly at: sc4sec@cme.nist.gov.

Industrial automation systems and integration — Reference data libraries for the process industries — Part 4: Initial reference data

1 Scope

This part of ISO 15926 defines the initial set of standard reference data for oil and gas production facilities.

The following are outside the scope of this part of ISO 15926:

- a) Data requirements for additional reference data.

NOTE 1 These requirements are specified in ISO 15926-6.

- b) The procedures to be followed for registration and maintenance of additional reference data

NOTE 2 These procedures are specified in ISO 15926-5.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 15926. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 15926-1:—¹⁾, *Industrial automation systems and integration — Integration of life-cycle data for oil and gas production facilities — Part 1: Overview and fundamental principles.*

ISO 15926-2:—¹⁾, *Industrial automation systems and integration — Integration of life-cycle data for oil and gas production facilities — Part 2: Data model.*

ISO 15926-5:—¹⁾, *Industrial automation systems and integration — Integration of life-cycle data for oil and gas production facilities — Part 5, Procedures for registration and maintenance of reference data.*

ISO 15926-6:—¹⁾, *Industrial automation systems and integration — Integration of life-cycle data for oil and gas production facilities — Part 6, Methodology for the development and validation of reference data.*

3 Terms, definitions, and abbreviations

For the purposes of this part of ISO 15926 the following terms, definitions and abbreviations apply; those taken or adapted from ISO 10303-1:1994 are repeated below for convenience.

NOTE Definitions copied verbatim from ISO 10303-1:1994 are followed by “[ISO xxxxx-y]”. Definitions that have been adapted from other standards are followed by an explanatory note.

3.1**application object**

a thing that can have its existence recorded

NOTE This is a different definition of this term from that found in ISO 10303-1. This definition is consistent with the use of this term in the data model defined in ISO 15926-2.

3.2**application object instance**

an instance that represents a particular application object

3.3**class**

A subdivision, sort or category with rules that define inclusion and exclusion of members.

3.4**commodity product class**

a class of manufactured item that conforms to agreed open standards

3.5**core class**

a class that is a commonly used subdivision corresponding to terms used in common language

3.6**data**

a representation of information in a formal manner suitable for communication, interpretation, or processing by human beings or computers

[ISO 10303-1]

3.7**defacto class**

a class corresponding to common natures that are widely recognised but not formally defined or agreed

3.8**information**

facts, concepts, or instructions

[ISO 10303-1]

3.9**instance**

data that represents, in computer processable form, some real world thing

NOTE This is a different definition of this term from that found in ISO 10303-11.

3.10**manufactured item class**

a class whose members are manufactured products

3.11**proprietary product class**

a manufactured item class where the copyright to specifications of conditions for membership is controlled in a proprietary or closed way.

3.12**reference data**

data, in the form of application object instances, that represents reference information.

3.13**reference data library**

a managed collection of reference data

3.14**reference information**

information about a 'thing' or type of 'thing' which is of common interest to many process industries facilities and users;

3.15**standards class**

a class where the conditions for membership are owned/controlled by a standardisation body.

4 Initial set of reference data

4.1 Types of classes

Reference data is subdivided into the following categories of classes

- core classes
- de facto classes
- standards classes
- commodity product classes
- proprietary product classes

The relationship between the different class types is illustrated in Figure 1.

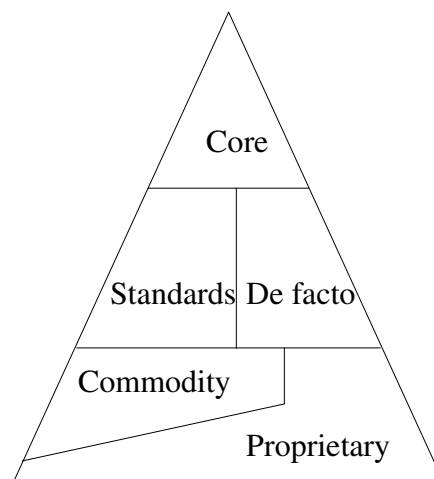


Figure 1 Types of classes

The position of a class relative to the top and base of the triangle indicates the degree of definition. Classes at the top are general and have few restrictions on membership, whereas those at the base are more specific. Classes at the base of the triangle are specialisations of the ones above, and so on up the triangle.

Core classes are every day generic subdivisions, are widely known, and correspond to terms used in common language. The conditions for membership are often undefined. Understanding of the class usually is conveyed by example.

EXAMPLE Pipe, floor, pump, light bulb are all core classes.

De facto classes are further subdivisions of the core classes defined by qualities that allow interchange of class members for particular purposes. For example, a manufacturer may choose to make a product of similar specification to that of another manufacturer in order to compete for the market share by choosing to conform to some characteristics of the other product. Often de facto standards are later formalised by international, national or industry agreement.

EXAMPLE 3.5" floppy disc and HB pencil are defacto classes.

Standards classes result from the work of national, international or industry standardization bodies and cover sizes, shapes, materials, performance and manufacturing processes of equipment and materials. The rules for exclusion and inclusion (or conformance) are agreed by an open process whereby anybody can participate. A standards class may only constrain one particular aspect and often be insufficient to determine usage or how to make it.

EXAMPLE The ASME B16.9 standard constrain the dimensions and shapes of steel butt welding pipe fittings.

EXAMPLE The IEC 79-1 standard specifies constraints on electrical equipment to ensure standard degrees of explosion proofness.

Commodity product classes have sufficient characterisation to indicate suitability of use. They are specialisations of one or more de facto and/or standard classes. The resulting specification is non proprietary as no one organisation controls it.

EXAMPLE The type of lightbulb known as 60 W 230 V E27 represents a commodity class.

Proprietary product classes are specializations that depend rules of inclusion and exclusion some of which are controlled in a closed way. This means that some aspects of the specification can be arbitrarily changed. Many proprietary product classes are specializations of commodity product classes and or de facto classes, where the additional restrictions reflect design or manufacturing details that the manufacturer uses to differentiate his product from others of the same general type.

EXAMPLE Lightbulbs 60 W 230 V E27 manufactured by Phillips represents a proprietary product class

4.2 Information scope of reference data

The initial set of ISO 15926 reference data consists of core classes representing:

- the physical nature of manufactured equipment and materials
- the physical nature of the environment
- equipment and material features
- functional natures of equipment and materials
- spatial and temporal characteristics of equipment and materials
- physical properties of equipment, materials
- measurement units for physical properties
- materials of construction

- process materials
- activities and events
- information
- document annotations and symbols

The initial set of reference data excludes all individuals.

Propose figures to be included when we have an agreed structure with STEPlib. Currently we have in isolated areas, but not completely because of the “equipment”-issue. I guess this has to wait until Andries is back. A related issue which also need resolution, is the distinction between what is ‘artefact’ and ‘role/function’.

Annex A (normative)

Information object registration method

In order to provide unambiguous identification of schemas and other information objects in an open information system, this International Standard employs the registration technique defined in ISO/IEC 8824-1.

NOTE This registration technique is equivalent to that defined in 4.3 of ISO 10303-1 for information objects standardized in ISO 10303.

This technique identifies objects by their assignment to a tree structure whose root is ISO itself. Each node in the tree is identified by a sequence of integers corresponding to the index of the leaf under each node. Nodes that identify agencies that can further specify inferior nodes are called registration authorities. There is provision in this technique for having registration provided by national bodies and other identified organizations (including private corporations). A registration authority is automatically granted to the technical committee or subcommittee that prepares a standard in order to identify objects within the standard.

Thus, ISO 15926 is identified by the object identifier:

{ 1 0 15926 }

Here the initial 1 indicates ISO; the 0 following it identifies the object as a standard, and the number following that is the number of the standard. ISO/IEC 8824-1 also defines identifiers to stand in the place of these numbers; thus 'iso' has the value 1 and 'standard' has the value 0. For multi-part standards, the next number is required to be the part number. Thus, this part of ISO 15926 is identified by the object identifier:

{ iso standard 15926 part(r) }

Here, the value of the part number is given explicitly, but the notation allows us to associate a term with this value, thereby providing some semantics. The notation for values of this type is defined in clause 28 of ISO/IEC 8824-1, and the predefined assignments are specified in annex B of ISO/IEC 8824-1.

For the purposes of identifying information objects unambiguously within an open information system, ISO 15926 adopts the following conventions:

- a) The value following the part number shall be version number. By convention, the value of the version number of the first edition shall be 1. The value 0, if used at all, is reserved to refer to DIS documents.
- b) The value following the version number is used to identify the type of information object defined within the part. The value 1 shall indicate that the object so identified is a schema.
- c) The value following the object type is an integer that identifies the instance of the object type so identified.
- d) To meet the syntactic requirements of ISO/IEC 8824-1, replace each occurrence of underscore character “_” in a schema name with a hyphen when defining this value.

EXAMPLE The oil_and_gas_production_facilities schema defined in ISO 15926-2 can be identified by the value

{ iso standard 15926 part(2) version(1) object(1) oil-and-gas-production-facilities
(1) }

Annex B

(normative)

Information object registration

To provide for unambiguous identification of an information object in an open system, the object identifier

`{iso standard 15926 part{r} version {1}}`

is assigned to this part of ISO 15926. The meaning of this value is defined in ISO/IEC 8824-1, and is described in Annex A.

This is the object identifier that will apply to the published (IS) version of this part of ISO 15926.
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Annex C (informative)

Reference data URL

To be added later

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